

## Original Research

# Measuring depression and anxiety prevalence among Iraqi healthcare college students using hospital anxiety and depression scale

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Received (first version): 29-Jan-2021

Accepted: 25-Apr-2021

Published online: 7-May-2021

### Abstract

**Objective:** The study aimed to 1) measure the prevalence of depression and anxiety among Iraqi pharmacy and medical students at a number of universities in Baghdad using Hospital Anxiety and Depression Scale (HADS) and 2) investigate the association between various sociodemographic factors and students' HADS scores.

**Methods:** This study was based on a cross-sectional descriptive design in four universities in Baghdad, Iraq. Depression and anxiety were screened using an Arabic version of the HADS. An online survey was administered via Qualtrics to convenience samples of students at four colleges of pharmacy and a college of medicine between March and June 2018. Multiple linear regression was used to identify factors associated with depression and anxiety symptoms among the participants.

**Results:** The researchers received 750 usable surveys. The participating students spent more time browsing social media (6.64 hours/day) than studying (1.92 hours/day) and exercising (2.83 hours/week). Approximately forty-six percent (45.9%) of the participants had scores that indicated depression symptoms and one-quarter (24.8%) had scores that indicated depression borderline symptoms. More than one-half (52.1%) of the participants had scores that indicated anxiety symptoms, while 20.1% had scores that indicated anxiety borderline symptoms. According to the multiple linear regression analysis, more depression and anxiety symptoms were significantly ( $p$ -value  $<0.05$ ) associated with higher study hours weekly and lower sleep hours at night, academic achievement, and colleagues and family social support during exams.

**Conclusions:** Pharmacy and medical students may be vulnerable to depression and anxiety because of long study hours. To reduce their levels of anxiety and depression, they may need more social support, more exercise, more sleep, less social media use and a lower academic workload.

### Keywords

Depression; Anxiety; Anxiety Disorders; Students, Medical; Students, Pharmacy; Academic Success; Sleep; Exercise; Social Support; Workload; Prevalence; Linear Models; Cross-Sectional Studies; Iraq

## INTRODUCTION

Depression and anxiety are serious health conditions that affect increasing numbers of people globally.<sup>1</sup> Depression is characterized by sadness, loss of interest or pleasure, feeling of guilty or low self-worth, disturbed sleep or appetite, feeling of tiredness and poor concentration, while anxiety patients present with a feeling of anxiety and fear.<sup>2</sup> According to the 2017 World Health Organization (WHO) report, nearly 322 million people (4.4%) worldwide live with depression and about 264 million people (3.6%) globally live with anxiety.<sup>1</sup> According to a recent Iraqi Ministry of Health (MOH) report, 16.5% of Iraqi people older than 15 years of age suffer from psychological diseases.<sup>3</sup> In 2015, the prevalence of depression and anxiety in Eastern Mediterranean Region was 9% and 10%, respectively.<sup>1</sup> Depression affects nearly 10.9% of individuals aged 18-25 years, which is a key population segment in each society as it primarily constitutes college students.<sup>2</sup> It

is noteworthy that depression can lead to suicide which is the second leading cause of death in young adults (15-29 year old) globally.<sup>4</sup>

A recent meta-analysis (2019) included 69 studies comprising 40,348 medical students found the highest prevalence of anxiety was in the Middle East (42%).<sup>5</sup> A study in Egypt found that 30.3% of 164 pharmacy students experienced moderate to severe anxiety symptoms.<sup>6</sup> In a WHO report that surveyed international college students at 19 colleges across 8 countries (Australia, Belgium, Germany, Mexico, Northern Ireland, South Africa, Spain, United States), about 35% of first-year college students reported mental health disorders.<sup>7</sup> A systematic review of data from 195 countries over 27 years found that depression ranks the largest contributor to health loss for both sexes globally.<sup>8</sup> Moreover, nearly 50% of people with depression do not receive adequate treatment.<sup>9</sup> To highlight this global expanding condition, the WHO launched a campaign called "Depression: Let's Talk" in 2017 to help people with depression get help worldwide.<sup>9</sup> In Iraq, the prevalence rates were estimated at 3.7% for depression and 4.5% for anxiety.<sup>1</sup>

Although there are many studies of medical students' mental health, there is little research evaluating mental health in pharmacy students.<sup>10</sup> One study in the United States (U.S.) including students of five healthcare colleges found that 19.4% of the participants had social isolation.<sup>10</sup>

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This study found that interpersonal (relationships with faculty and other students), and organization (university/college requirement) factors can be associated with student social isolation.<sup>10</sup> Studies have shown that the prevalence of depression among pharmacy students ranges from as low as 22.6% (in Malaysia) to as high as 51.5% (in Egypt).<sup>6,11</sup> Factors accounting for a higher prevalence of depression in college students included age related factors, stressors specific to the educational environment, and daily life stressors. The potential consequences of these psychological problems on pharmacy students at the personal and professional levels include increased difficulty with classroom learning, deteriorating healthcare practice, increasing the likelihood of prescription errors, and lower quality of patient care.<sup>7,12</sup>

A study that investigates the relationship between educational factors, sociodemographic factors, depression and anxiety in Iraqi pharmacy and medical college students is of crucial importance to shed the light on these two common mental disorders in terms of prevalence and associations. .

The aims of this study were to 1) estimate prevalence of depression and anxiety among a sample of Iraqi pharmacy and medical students at different universities in Baghdad using the Hospital Anxiety and Depression Scale (HADS) and 2) evaluate the association between various sociodemographic factors and educational factors and students' mental health.

Characteristics	N	%	Item	N	%									
Age (years)			Sleep hours during night											
			19	78	11.8	1-4.5	84	12.3						
			20	144	21.9	5	214	31.4						
			21	185	28.1	6	175	25.7						
			22	128	19.4	7	80	11.7						
			23	93	14.1	8	36	5.3						
			24 and more	31	4.7	9-12.0	19	2.8						
Total	659	100.0	Total	682	100.0									
Gender			Sleep time											
						Male	171	25.9	10-10:45 PM	45	6.6			
						Female	488	74.1	11-11:45 PM	103	15.1			
Total	659	100.0	12-1 AM	268	39.2									
College year			Total											
						1st	29	4.4	After 1 AM	267	39.1			
						2nd	105	16.0	Total	683	100			
						3rd	196	29.9	Study Schedule					
						4th	196	29.9				Daily	156	22.8
						5th	129	19.7				Weekly	234	34.2
Total	655	100.0	Before exam only	294	43.0									
College name			Study hours weekly											
						Pharmacy/ Baghdad	340	51.7	0-5	215	32.7			
						Pharmacy/ Yarmouk	44	6.7	6-10.0	165	25.1			
						Pharmacy/ Asool Al-Deen	61	9.3	11-15.0	73	11.1			
						Pharmacy/ Nahrain	99	15.0	16-20	62	9.4			
						Medical/ Nahrain	110	16.7	21-28	65	9.9			
						Others	6	0.9	30.-100	77	11.7			
						Total	658	100.0	Total	657	100.0			
Marital status			Academic achievement											
						Single	606	92.1	Fair	150	21.9			
						Married	21	3.2	Medium	267	39.0			
Paid job			Total											
						Engaged	31	4.7	Good	213	31.1			
Chronic disease/ disability			Missed classes											
						Yes	55	8.3	Very Good	54	7.9			
						No	606	91.7	Total	684	100.0			
Lost parent			Smoke hookah											
						Yes	661	100.0	Daily	95	13.9			
						No	603	91.2	Weekly	180	26.3			
						Yes	58	8.8	Rare	325	47.4			
Total	661	100.0	Never	85	12.4									
Total			Total											
						Yes	588	89.0	Yes	58	8.4			
						No	73	11.0	No	630	91.6			
Total	661	100.0	Total	688	100.0									

Item	N	%
<b>Social Activities</b>		
Sport	210	25.3
Visit friends and relatives	196	23.6
Visit Religious places	91	11.0
Go out with family and friends	334	40.2
Total	831	100.0
<b>Family support during exams</b>		
No	85	12.9
Sometimes	252	38.1
Always	324	49.0
Total	661	100.0
<b>Have a clear plan for professional goals</b>		
No	342	51.8
Yes	318	48.2
Total	660	100.0
<b>Mean (STDEV)</b>		
Sleep hours/ night	5.50	1.5

Activities	hours
Watch TV	3.17
Browsing Facebook	22.97
Sport	2.83
Study	13.46
Go out with family/friends	3.76
Visits friends/relatives	3.01
Religious activities	1.3

## METHODS

This was a cross-sectional descriptive study that was conducted in four universities (two public and two private) in Baghdad, Iraq. A web-based self-reported survey was administered to pharmacy and medical students. The electronic survey was administered through Qualtrics Survey Software (Qualtrics, Inc, Provo, UT). The survey link was distributed electronically via Facebook groups (closed groups for academic purposes) to a convenience sample of students at four colleges of pharmacy and a college of medicine between March 11 and June 4, 2018. The authors reached out to faculty members at different universities/colleges to distribute the survey link among their student groups. Additionally, final-year pharmacy students helped to distribute the survey on their class Facebook closed (academic) group(s).

Depression and anxiety were measured using the HADS questionnaires, which is a valuable tool utilized by many studies for this purpose. The HADS scale was used because it is a validated tool that can measure both depression and anxiety symptoms even in apparently healthy subjects. In 2014, the HADS scale was validated to detect anxiety and depressive disorders among a large sample of French employees from 16 large companies.<sup>14</sup> Additionally, a recent (2019) master thesis from Cardiff University School

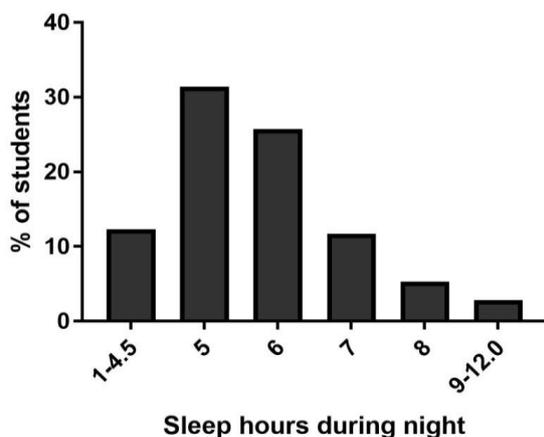


Figure 1. The distribution of students' sleep hours during the night

of Medicine, Philosophy Department confirmed that the HADS is an appropriate tool for measuring anxiety and depression in medical students.<sup>15</sup> The HADS four-point scales were used to answer the survey questionnaires (0-normal, 1-mild symptoms, 2-moderate symptoms, 3-severe symptoms).

The survey included 28 demographic items and 14 HADS items. At the end of the survey, sociodemographic information was collected from the students including age, gender, social status, year of study, name of the university, academic achievement, smoking cigarette/hookah, lost parent and having chronic disease/disability. The participants were also asked about the different life activities (sport, religious, social, going out, having professional plan, study hours, sleep hours, TV watching, social media browsing, and types of social media used). The survey also included two questions about receiving social support from family and friends. The items had categorical answers except some questions needed to type numbers such as the hours spent for study, sleep, social media browsing and social activities. An expert in Social and Administrative Pharmacy (with 37 published peer-reviewed studies in the field) developed the demographic and activity questions.

The survey was pretested (pilot study) during February 2018 to evaluate the clarity of demographic and social activity items. To avoid any language barrier, the instructions and all survey items were translated into Arabic. No incentives were offered. The survey was optional and anonymous. This study proposal was approved by the Ethical Committee at the University of Baghdad College of Pharmacy.

## Statistical analyses

The analyses were conducted using the SPSS version 22, (IBM, New York, USA). Means, ranges, standard deviations (SD), frequencies and percentages of participant characteristics were calculated. The reliability analyses of both depression (7 items) and anxiety scales (7 items) were measured using Cronbach's alpha as an indicator of internal consistency. Multiple linear regression was used to identify the factors associated with depression and anxiety symptoms among the participants. The independent

Social media	Student users (%)	Daily hours
Facebook	81.7	3.28
WhatsApp	12.9	1.13
Viber	15.3	1.2
Instagram	63.1	2.47
Snapchat	31.4	2.06
Telegram	68.6	2.86
Others	18.5	-

		% of students
Total HADs depression score	Abnormal	45.9
	Borderline	24.8
	Normal	29.3
Total HADs anxiety score	Abnormal	52.1
	Borderline	20.1
	Normal	27.7

variables included demographic characteristics, while the total score of HADS was the outcome variable. A p-value of less than 0.05 was statistically significant.

## RESULTS

The researchers received 865 surveys, but only 750 were usable (with  $\geq 70\%$  of completed answers). Of the five participating colleges, the University of Baghdad College of Pharmacy (51.7%) had the highest percentage of participants followed by the University of Nahrain College of Medicine (16.7%) and University of Nahrain College of Pharmacy (15%). Approximately three-quarters (74.1%) of the participants were female students and 95% were between 19 and 23 years of age. The vast majority of the participants were single (92.1%), while only 7.9% were married or engaged (Table 1). Only 8.1% of the participating students had a paid job. More than ninety-one percent (91.2%) of the participants did not report any chronic diseases and 89% had not lost a parent (Table 1). Thirty-nine percent reported good or very good levels in their academic performance (Table 1).

More than half of the participating students (51.8%) had no clear plan for professional goals (Table 2). More than three-quarters of the participants reported going to bed after midnight and 69.4% reported sleeping less than 7 hours each night. Forty percent of the students reported going to bed after 1:00 AM with an average of 5.5 hours of sleep per night (Figure 1). Less than one-half (49%) always had family support during the exams (Table 2). The average student study time per week was 13.46 hours. However, they spent more time browsing social media (6.64 hours/day) than studying (1.92 hours/day), exercising (2.83 hours/week) and social activities (Table 3). The most browsed social media included Facebook (3.3; SD 3.7 hours/day), Telegram (2.9; SD 3.3 hours/day) and Instagram (2.5; SD 3.0 hours/day) (Table 4). Similarly, the most used social media by the students were Facebook (81.7%), Telegram (68.6%) and Instagram (63.1%) (Table 4).

Both scales had good internal consistency (reliability) since the Cronbach' alpha of the depression and anxiety scales were 0.75 and 0.83, respectively. Depressive symptoms were quite prevalent among healthcare students (45.9%) and one-quarter (24.8%) reported borderline symptoms of depression (Table 5). More than one-third of the participants (36.4%) reported very seldom enjoying a good book, movie or TV program (Figure 2). The depression symptom with highest score (average of 1.88 out of 3) was "I feel as if I am slowed down".

On the other hand, more than one-half (52.1%) of the participants had scores consistent with anxiety symptoms, while 20.1% reported borderline anxiety symptoms (Table 5). More than 31% of the students reported they "feel tense" most of the time (score 3) (Figure 3).

According to the linear multiple regression analysis, five factors were significantly ( $p < 0.05$ ) associated with depression symptoms including sleep hours at night, weekly study hours, academic achievement, and colleagues and family social support during exams (Table 6). There was a negative association between the number of sleep hours during the night and depression symptoms. In other words, students who reported getting more sleep at night experienced fewer symptoms of depression. More study hours were positively associated with the severity of depression symptoms (higher study hours are associated with more depression symptoms). However, students with higher academic achievement experienced a lower level of depression symptoms. Family and colleagues' support during exam significantly reduced the level of depression symptoms (Table 6).

According to the multiple linear regression analysis, five factors were significantly ( $p < 0.05$ ) associated with anxiety symptoms including sleep hours at night, study hours weekly, academic achievement, having chronic disease/disability and colleagues' and family social support during exams (Table 7). There was a negative association between the number of sleep hours at night and anxiety symptoms. In other words, students who got more sleep experienced lower symptoms of anxiety. More study hours were positively associated with the severity of anxiety symptoms (higher study hours are associated with more anxiety symptoms). However, students with higher academic achievement experienced a lower level of anxiety symptoms. Family and colleagues' support during exam significantly reduced the level of anxiety symptoms (Table 7).

Independent variable	STD Beta	95%CI	p-value
Sleep hours during night	-0.152	-0.644 : -0.225	0.0001
Weekly study hours	0.080	0.002 : 0.052	0.035
Academic achievement	-0.167	-1.136 : -0.436	0.0001
Colleagues support during exams	-0.209	-1.806 : -0.844	0.0001
Family support during exams	-0.148	-1.346 : -0.430	0.0001
Lost parent	-0.027	-1.361 : 0.635	0.475
Chronic disease/ disability	-0.008	-1.192 : 0.950	0.825
Smoke hookah	-0.028	-1.479 : 0.653	0.447

R-square=0.147 (depression model); Outcome variable=total depression HADs score  
95%CI=95% Confidence Interval for B; STD= Standardized



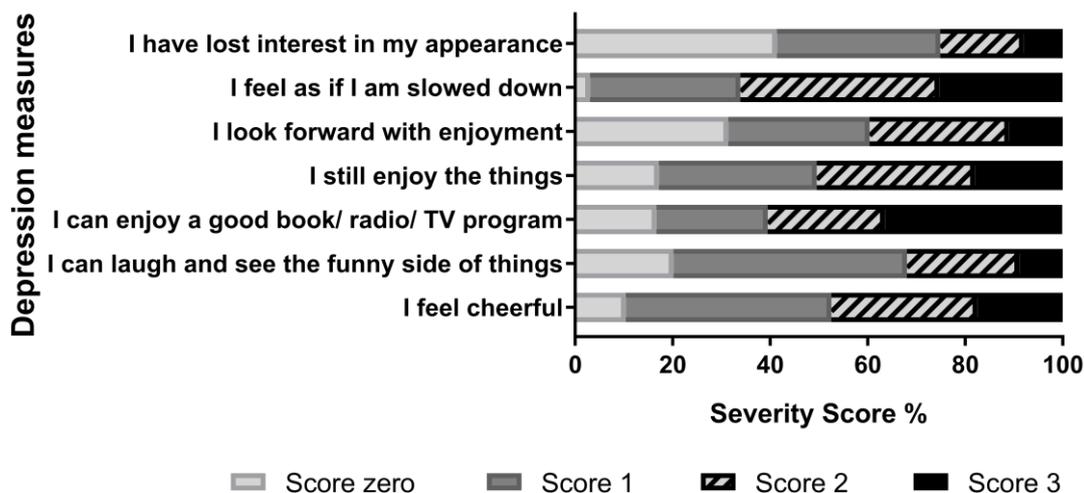


Figure 2. Severity of depression symptoms among students  
0= Lowest depression/anxiety score, while 3= highest depression/anxiety score.

## DISCUSSION

In this study, evaluation of depression and anxiety among medical and pharmacy students is crucial as it may consequently influence healthcare services after their graduation. When healthcare providers suffer from psychological/mental disorder like depression or anxiety, this will influence their learning and eventually may have a negatively impact on patients and healthcare system.<sup>16</sup>

In the present study, the HADS scale was used to measure the depression and anxiety prevalence and their associated factors among students of pharmacy and medicine. Although the HADS report is not intended for diagnostic purposes, its epidemiological value has been evaluated in several studies which concluded that it is a reliable indicator of depression and anxiety.<sup>17-20</sup> It is important to indicate that actual diagnosis of mental illness requires a full assessment by a physician.<sup>21</sup>

The study findings showed that most of the participants (about 74%) were female students. Since 2003, the majority of healthcare college students in Iraq are women

because they usually score higher in Baccalaureate exam of high school.<sup>22</sup> Having no clear plan for their professional goals may be due the students mainly rely on the governmental employment policy which usually hire all healthcare graduates in the public sector (governmental sponsored) after graduation. Additionally, they will be registered health professionals in the private sector after completing their temporally residency program in the public sector.<sup>22</sup>

Analysis of the data revealed a high prevalence of depression and anxiety among pharmacy and medical students. More than half (52.1%) of the students reported anxiety symptoms and 45.9% of the students had depression symptoms. This high rate of depression and anxiety might be contributed to the war environment, violence and economic crisis that Iraqi people experience during the past three decades. A similar higher rate of depression (57.2%) was also reported by a previous study in the general Iraqi population.<sup>21</sup> A study of social isolation in the U.S. found 19.4% of healthcare college students experience social isolation due to overwhelming study.<sup>10</sup>



Figure 3. Severity of anxiety symptoms among students.

Table 7. Multiple linear regression of factors influencing anxiety levels among healthcare students			
Independent variables	STD Beta	95%CI	p-value
Sleep hours during night	-0.135	-0.677 : -0.194	0.0001
Weekly study hours	0.081	0.002 : 0.060	0.037
Academic achievement	-0.171	-1.311 : -0.504	0.0001
Colleagues support during exams	-0.158	-1.683 : -0.575	0.0001
Family support during exams	-0.115	-1.305 : -0.249	0.004
Lost parent	-0.005	-1.224 : 1.075	0.899
Chronic disease/ disability	-0.075	-2.477 : -0.009	0.048
Smoke hookah	0.007	-1.110 : 1.347	0.850
R-Square=0.109 (anxiety model); Outcome variable=anxiety HADs score. 95%CI=95% Confidence Interval for B; STD= Standardized			

However, according to the WHO report in 2015, the prevalence of depression and anxiety in Iraq was 3.7% and 4.5%, respectively.<sup>1</sup>

For students with depression, we found a significant negative association between their depressive status and sleeping hours (Table 3). The students who had less sleep hours were more likely to experience depression symptoms. We reported that the average night sleeping time of all participants was 5.5 (SD 1.5) hours, and the majority (69.4%) reported sleeping less than 7 hours per night (Table 2). In addition, we also found that about 40% of participants got to sleep after 1:00 AM. This may consequently lead to reduced sleep hours as students have to wake up early morning to go to college. Having insufficient sleep hours may be due to heavy course work which lasts for 5 years (10 semesters).<sup>23</sup> Similarly, a previous study has revealed a relationship between inadequate sleep hours and depression occurrence.<sup>24</sup> According to a systematic review and meta-analysis including a total of 5,172,710 participants from 153 studies, short sleep was significantly associated with increased mortality.<sup>25</sup> A study in Singapore found that depression and anxiety are correlated with sleep disturbances.<sup>26</sup> Similarly, a meta-analysis including seven prospective studies and 25,271 patients found a significant positive association between short sleep duration and depression.<sup>27</sup>

Although we could not find a direct relationship between the use of social media and depression/anxiety severity in this sample of students; however, long time of social media usage (mean 6.6 hours/day) may potentially contribute to late sleeping. According to a large-scale cross-sectional study including 23,533 adults, there is a significant positive association between addictive social media using and mental disorders including depression.<sup>28</sup>

This study showed that longer studying hours were positively associated with the occurrence of depression and anxiety (Tables 3 & 4). This could be explained by a state of social isolation possibly resulting from the longer studying hours. Similarly, business with heavy coursework was associated with social isolation according to an American study of healthcare students.<sup>10</sup> Furthermore, longer studying hours may indirectly influence sleeping time, which contributed to depression and anxiety.

In this study the family and colleagues support had significant protective effects against depression and anxiety (Tables 3 & 4). Students who got support from their families or colleagues reported lower scores of depression and anxiety. Likewise, a study conducted in the context of social support and depression and has concluded lower

depression symptoms in the presence of social support.<sup>29,30</sup> An American study found the involvement in organization and community activities can help to reduce social isolation among healthcare students.<sup>10</sup>

This study found that academic achievement of students was negatively related to their depression and anxiety scores. The competition to get high GPA is high among healthcare students since it can decide their acceptance in clinical residency specialties for medical graduates and in Clinical Pharmacy Program for pharmacy graduates.<sup>31</sup> Likewise, our team found that peer competition has link to social isolation among American healthcare students.<sup>10</sup> Consistent with our report, a previous study suggested that depression and anxiety states would lead to poor academic achievements, and this may negatively influence their prospective career and success.<sup>32</sup>

The current study also revealed that students mostly used Facebook as social media application with an average of (3.28 hours browsing daily). Similarly, a previous Iraqi study (2015) found that pharmacy students have used Facebook for academic purposes and to communicate with their instructors.<sup>33</sup> They had closed Facebook groups to communicate for academic purposes. After March 17, 2020, the university education in Iraq was converted totally to electronic due to COVID-19 pandemic.<sup>34</sup> Thus, this high degree of using social media for academic purposes may be reduced during the COVID-19 pandemic era due to using formal electronic course management platforms such as google classroom.<sup>34,35</sup> In addition, about 70% of students did not watch TV daily, and this could be explained by the development of internet network ability to attract younger generations. Increasing time of browsing social media applications were on the expense of sport, social and religious activities.<sup>10</sup> A Scottish study found that adolescents who used social media frequently experienced lower sleep quality, lower self-confidence and higher levels of anxiety and depression.<sup>36</sup>

#### Limitations

The study had some limitations. The study covered several pharmacy colleges, but only one medical school. Thus, the study sample may not represent medical college students. Additionally, the survey sample was convenience and conducted in one province (Baghdad, capital). The study was conducted before COVID-19 pandemic when the education was in-class. Thus, the prevalence of the anxiety and depression may have been increased after switching classes to electronic due to the pandemic since March 2020.

## CONCLUSIONS

The students at healthcare colleges are vulnerable to mental illness and anxiety because of study workload and sleep deprivation. To reduce their levels of anxiety and depression, they need more social support, more time for exercise, longer sleep hours, less social media use and a lower academic workload. The study findings give us a warning about the emotional/mental health of healthcare students. Hence, as educators, we need to enhance students' social support/activities and work to elevate their stressful environment. The universities might need to enhance their mental health counseling services for their students and work to engage them into regular social and sport activities.

## CONFLICT OF INTEREST

There are no conflicts of interest to disclose.

## FUNDING

None.

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Supervision: SHK, AAA.  
Investigation: AAA, Validation: AAA.  
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Formal analysis: MN, SVH, AAA.  
Writing –original draft: SHK, AAA.  
Writing–review & editing: SHK, AAA, MN, NN, DAK.

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